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ABSTRACT

One in a series of publications on Illinois' State Goals for Learning, this report identifies what students are expected to know in the biological and physical sciences by the time they complete their elementary and secondary education. A sample set of learning objectives is provided to assist districts in the development of their own objectives. Four state goals for the biological and physical sciences are presented and sample learning objectives related to each goal are offered for grades 3, 6, 8, 10, and 12. The state goals aim for student knowledge of: (1) concepts and vocabulary of biological, physical, and environmental sciences and their applications to a technological society; (2) social and environmental implications and limitations of technological advancement; (3) principles and applications of scientific research; and (4) processes, techniques, methods, equipment, and available technology of science. Appendices contain Illinois state goals for six learning areas (language arts, mathematics, biological and physical sciences, social sciences, fine arts and physical development and health) and also sample questions and answers about the state's learning objectives and assessment. (ML)

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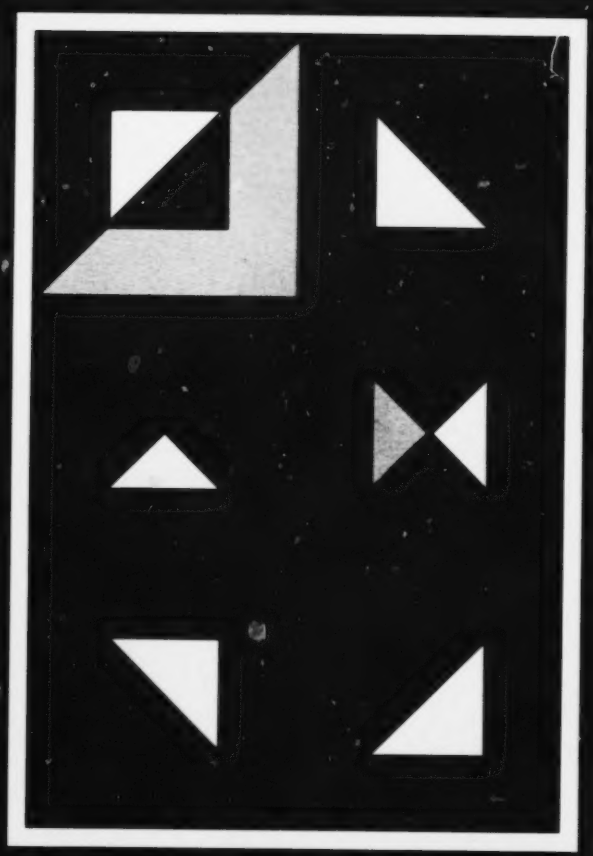

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STATE GOALS FOR LEARNING

AND SAMPLE LEARNING OBJECTIVES

BIOLOGICAL AND PHYSICAL SCIENCES

GRADES 3, 6, 8, 10, 12

Illinois State Board of Education
Department of School Improvement Services

Walter W. Naumer, Jr., Chairman
Illinois State Board of Education

Ted Sanders
State Superintendent of Education

INTRODUCTION

The 1985 educational reform legislation addressed nearly every aspect of schooling and provided a unique opportunity for local school districts and the State Board of Education to work cooperatively to improve education in Illinois. One of the most important pieces of the legislation, one which has long-range implications for learning and teaching in Illinois schools, provides for the development of learning goals and assessment systems at both the state and local levels.

Legislative Requirements

Public Act 84-126, effective August 1, 1985, amended The School Code of Illinois to include, for the first time in the state's history, a definition of schooling and a requirement that the goals for learning be identified and assessed. Specifically, the law requires the following:

The State Board of Education must establish goals consistent with the primary purpose of schooling. The legislation defines the primary purpose of schooling as the transmission of knowledge and culture through which children learn in areas necessary to their continuing development: language arts, mathematics, biological and physical sciences, social sciences, fine arts, and physical development and health.

Local school districts must establish student learning objectives which are consistent with the primary purpose of schooling and which meet or exceed goals established by the State Board.

School districts must also establish local goals for excellence in education.

The State Board must establish assessment procedures for local school districts. This includes the establishment of a common month for testing in each school year, the development of state test items to be included along with each of the district assessments, and the development of model assessment procedures which school districts may elect to use.

School districts must assess student learning to determine the degree to which local goals and objectives are being met. This assessment is required at least at grades 3, 6, 8 and 10, with the initial year for assessment staggered according to learning area and grade level.

School districts must develop local plans for improvement in those areas where local goals and objectives are not being met.

School districts must disseminate the local goals and objectives to the public, along with information on the degree to which they are being achieved and, if not, what appropriate corrective actions are being taken by the district.

The State Board must approve the local school district objectives, assessment systems, plans for improvement, and public reporting procedures.

The intent of these requirements is to put into place a system which will assure, to the maximum extent possible, that elementary and secondary school students learn what the state and local communities regard as important.

Purpose of this Publication

During the next several years, beginning in 1987, school districts will be required to submit their objectives for student learning to the State Board of Education. These objectives must meet or exceed the State Goals for Learning and must also identify local goals for excellence in education. The purpose of this publication is to provide assistance to local school districts in fulfilling these requirements.

This document is part of a series of six publications, one for each of the primary learning areas stated in the law. It identifies State Goals for Learning in a specific learning area* and a sample set of district-level learning objectives which are in our view consistent with those Goals. School districts have the option to adopt or adapt these objectives for local use or to develop a completely different set which is consistent with State Goals and is based on their view of local needs and conditions.

State Goals for Learning vs. District-Level Learning Objectives

The legislation adopted in the summer of 1985 required the State Board of Education to adopt State Goals for Learning in each of the six primary areas identified in law: language arts, mathematics, biological and physical sciences, social sciences, fine arts, and physical development and health. With the assistance of a committee chaired by Dr. John Corbally and representatives of education, business and the general public, the State Board completed this task in October 1985.

The State Goals for Learning are broadly stated, relatively timeless expressions of what the State of Illinois wants and expects its students to know and be able to do as a consequence of their elementary and secondary schooling. They are terminal goals--that is, they identify what students are expected to know by the time they complete their elementary and secondary

* State Goals for Learning in all six learning areas are found in Appendix A.

education. The state's interest is focused less on when or how the desired knowledge and skills are acquired than on the ultimate results of local efforts. Therefore, each local school district will be given the maximum flexib lity allowed by law for deciding when and how they wish to approach the teaching of various skills and understandings.

The State Goals for Learning should not be confused with graduation requirements; they are statements of the expectations which are held for all Illinois students. Some students will far exceed them. Others may not achieve them initially, but that reality should not lessen the expectations or the efforts expended on improving their performance. Local schools will be expected to adjust programs and allocate resources in a manner which is consistent with achievement of the desired level of student learning.

Local school districts are required to develop, and submit for approval by the State Board of Education, local learning objectives which meet or exceed the State Goals for Learning. These district-level objectives will identify the learning outcomes expected for students in their schools and are, in effect, the district goals for learning.

Like the State Goals for Learning, district-level objectives are intended to represent terminal goals for elementary and secondary schooling. This means that the process of developing district-level objectives should begin with the identification of objectives which define the learnings expected of students by the time they complete schooling. These then become the framework within which a school district identifies the progression of learning for its students.

It should be emphasized that because the State Goals for Learning represent end-point expectations, it will be necessary for elementary and secondary schools to be in close communication during the development of local district objectives.

Sample Learning Objectives

The sample set of district-level learning objectives presented in this publication was developed as a means of providing assistance to districts in the development of their own objectives.

The State Goals for Learning were deliberately stated in broad, general terms so that districts would have a large degree of latitude in developing instructional strategies and having their objectives reflect such local considerations. These sample district-level objectives provide one of the many possible sets of objectives which are consistent with the State Goals for Learning. Districts could choose to adopt these sample objectives as their own, although we would assume that none would do so without due consideration of local conditions and needs and an appropriate process of thoughtful review. Districts could also adapt these sample objectives to correspond to their own views. The approach we suggest is for school districts to use this sample set of learning objectives as a guide to assist them in their efforts to develop local district learning objectives.

This sample set of district-level learning objectives was developed with the assistance of an expanded version of the committee which helped to develop the State Goals for Learning and a technical writing committee. A draft document was provided to school districts in the spring of 1986, and after an intensive period of review and analysis, revisions were made. This final version represents the perceptions and comments of many thousands of Illinois citizens and educators.

The sample learning objectives for grades 3, 6, 8, 10 and 12 describe learnings which are in our view consistent with the State Goals for Learning. Although these sample objectives identify specific expectations, district objectives for grades 3, 6, 8, and 10 do not necessarily have to correspond. State Board approval of local objectives will be based on compatibility with the State Goals for Learning, not these sample objectives.

Some additional comments about what these sample district-level learning objectives are, and are not, intended to do.

1. They are not intended to specify instructional delivery systems. Although the objectives are listed in fundamental learning areas closely related to traditional course offerings or specific areas of the curriculum, it should be emphasized that the learnings can appropriately occur in a number of places in the curriculum. The focus is on student learning, not course offerings. Naturally, a student must have opportunities to learn the knowledge indicated or the skill specified in the objectives, but such activities do not of necessity have to occur within the learning area in which it is listed.

2. The number of sample learning objectives shown for a particular learning area is not intended to suggest the relative amount of instructional time which should be given to that area. Time allocations will vary for a variety of reasons totally unconnected to the length of a list of objectives.

3. The sample learning objectives identify behavior or knowledge in more general terms than those expected to be used in local district instructional objectives. The establishment of definitions at that more specific level is left to local discretion.

4. The sample objectives are intended to reflect a progression of learning which is consistent with learning theory and human development. Wherever possible, the sample objectives present a range of cognitive levels within a grade level. Learning sequences generally emphasize higher cognitive levels as grade levels increase from grade 3 to grade 12. However, some learning objectives remain the same from grade to grade--that is, objectives do not present a cognitive sequence that increases in difficulty across grade levels. Rather, these objectives imply an increase in the complexity and sophistication of learning materials and other stimuli appropriate to the developmental stage of the student.

5. The samples presented in this document do not cover all possible cognitive levels and learning sequences necessary for effective teaching and instruction. However, the samples are intended to present a broad picture of the knowledge and skills which meet the State Goals for Learning, without specifying the instructional activities necessary to achieve these learnings.

6. The sample learning objectives are not intended to reflect measures of student achievement or to prescribe instructional methods. Local curricular and instructional designs, course offerings, textbooks and materials, and other adjuncts to teaching and learning are determined locally. This Learning Outcome/Assessment program will not change that practice.

7. Although the State Goals for Learning and the sample learning objectives are identified within a specific area of learning, it is hoped that as local school districts develop their own objectives, they will consider the need to assure that students integrate knowledge and understand the interrelationships of the learning areas.

8. Although each district's objectives will serve as the basis for its district-level assessment program, these sample learning objectives are not the framework or basis for state assessment items. State assessment will be based on the more general areas defined in the State Goals for Learning.

Publication Format

In this publication, all of the State Learning Goals for this fundamental area of learning are listed in Section II. In Section III, the State Goals are listed with the general knowledge and skills which are related to each goal.

Section IV contains the sample learning objectives related to each Goal and keyed to the general knowledge and skills areas. The capital letter before each objective refers to the general knowledge and skills area. The objectives are numbered consecutively by each area. For example, sample learning objective D2 relates to the general knowledge and skills statement D and is the second sample objective listed for this grade level in this area. In this way, districts can reconstruct the progression used in developing the sample learning objectives. Each grade designation of sample learning objectives begins on a separate page so that all of the sample learning objectives for a particular level can be aggregrated.

Included in the Appendix are the State Goals for Learning for all of the six fundamental areas of learning and answers to some of the most frequently asked questions about this program.

Biological and Physical Sciences

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BIOLOGICAL AND PHYSICAL SCIENCES

The four State Goals for Learning in Biological and Physical Sciences provide a new perspective for education in science. The sample learning objectives which have evolved from the State Goals offer educators an opportunity to respond to the findings of research regarding how children learn.

Research studies by E. P. Torrance indicate that "man prefers to learn by exploring, manipulating, questioning, experimenting, risking, testing and modifying ideas and otherwise inquiring" (Torrance, E. P. 1963. Toward the More Humane Education of Gifted Children" Gifted Children Quarterly 7: 135-145). This, coupled with the findings of Jerome Kagan that a child's curiosity is nearly limitless, suggests that educators should provide more time for student participation in the activities of science (Kagan, Jerome. 1971. Understanding Children. New York: Harcourt, Brace, Jovanovich). Laboratory and field work, constructing and using models, and learning through the use of the instruments and tools of science are the components which science can offer to stimulate children's curiosity.

The State Goals for Learning that follow, therefore, were written to reinforce the importance of concepts, principles and processes which help students gather, organize and appiy information in all areas.

BIOLOGICAL AND PHYSICAL SCIENCES

Science is the quest for objective truth. It provides a conceptual framework for the understanding of natural phenomena and their causes and effects. The purposes of the study of science are to develop students who are scientifically literate, recognize that science is not value-free, are capable of making ethical judgments regarding science and social issues, and understand that technological growth is an outcome of the scientific enterprise.

State Goals for Learning

As a result of their schooling, students will have a working knowledge of:

- the concepts and basic vocabulary of biological, physical and environmental sciences and their application to life and work in contemporary technological society;
- the social and environmental implications and limitations of technological development;
- the principles of scientific research and their application in simple research projects;
- the processes, techniques, methods, equipment and available technology of science.

BIOLOGICAL AND PHYSICAL SCIENCES

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will have a working knowledge of the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 1

The following knowledge and skills are related to this State Goal for Learning:

A Symmetries or patterns in the natural and physical world.

B Orderliness in nature and the schemes we use to express this order.

C Fundamental units used to express the structure of nature.

D How two or more things interact and the effect each has on the other.

E Common characteristics of plant and animal communities.

F Characteristics of energy and matter.

G Equilibrium applied to simple systems.

H Influence of a field on objects within its domain.

I Cause and effect relationships which allow predictions to be made.

J Cycles in which conditions or events are repeated at regular intervals.

K Systems as defined by boundaries.

L Stages, mechanisms, and rates of change.

M Organism as a system which can be characterized by the processes of life.

N Relationship of structure to function.

O The nature of force.

P Perception as our way of interpreting the world.

Q Time and space as dimensions which separate things and events.

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will have a working knowledge of the social and environmental implications and limitations of technological development.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 2

The following knowledge and skills are related to this State Goal for Learning:

A Relationships between science and technology.

B Selected nonrenewable and renewable natural resources.

C Relationships between the natural and technological world.

D Influence of scientific and technological research on the needs, interest, and financial support of society.

E Application of scientific research to consumer decision making.

F Application of selected ecological concepts to human and environmental situations.

G Society's responsibility for improving the environment and protecting natural resources.

H Environmental issues in light of scientific and technological knowledge and ethical principles.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will have a working knowledge of the principles of scientific research and their application in simple research projects.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 3

The following knowledge and skills are related to this State Goal for Learning:

A Ethical practices which include:

1. honesty and integrity in the recording and reporting of the results of scientific inquiry;
2. disclosure, including open discussion of ideas, techniques and results;
3. rights of subjects, humanness and respect for life.

B Basic scientific standards and research abilities which include:

1. Accuracy, skill and safe practices in laboratory activities;
2. Application of an operational definition using terms to physically describe the activity or result of a procedure;
3. Good experimental techniques which will be evident by the precision practiced during the investigation;
4. Systematization of data to maintain an orderly manner of review;
5. Effectiveness in communicating laboratory procedures and results;
6. Ability to analyze, evaluate or replicate the experimental work of others.

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will have a working knowledge of the processes, techniques, methods, equipment and available technology of science.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 4

The following knowledge and skills are related to this State Goal for Learning:

A Observation.

B Classification.

C Inference.

D Prediction.

E Measurement.

F Communication.

G Data collection, organization and interpretation.

H Operational definition development.

I Question and hypothesis formulation.

J Experimentation.

K Model formulation.

L Results verification.

M Scientific equipment use.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 3

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will have a working knowledge of the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 3, students should be able to:

A1. Identify patterns in the environment and recognize the regularity of their appearance.

A2. Demonstrate forms of symmetry that exist in common objects.

A3. Recognize shadow patterns resulting from three-dimensional objects.

A4. Compare different kinds of cloud patterns.

B1. Compare similar objects by their size.

B2. Compare living organisms and nonliving matter using observable characteristics.

B3. Recognize sounds as low or high pitch, loud or soft.

C1. Identify a surface by color, shape and texture.

C2. Compare solids, liquids and gases.

C3. Identify the components of soil.

D1. Observe the floating or non-floating characteristics of objects in water.

D2. Observe the effects of mirrors and lenses on light rays.

D3. Recognize interaction as the effect of one object on another.

D4. Distinguish between objects that do and do not interact with magnets.

E1. Recognize food chains that may exist among selected animal populations.

E2. Identify plants and animals as sources of food for humans.

E3. Identify factors that limit the ability of plants and animals to grow and reproduce.

F1. Recognize the sun as the principal source of the earth's energy.

F2. Identify foods as sources of energy.

F3. Demonstrate a simple battery and bulb electrical system.

F4. Recognize that ice and water are the same material.

H1. Identify gravity as earth's attraction on objects.

H2. Demonstrate that a magnet has a magnetic field.

H3. Identify characteristics of magnets and demonstrate how they interact.

I1. Observe the expansion effects of freezing water.

I2. Identify factors that affect seed germination.

I3. Observe how living things sense and respond to stimuli.

I4. Observe the effect of different soil types on plant growth.

J1. Understand the stages of a plant's life cycle.

J2. Compare the changing seasons.

J3. Recognize the daily activity cycles that occur in nature.

J4. Know the path of food and raw materials in a community.

J5. Identify the cycle of moon phases.

K1. Use the term system to refer to a group of related objects.

K2. Relate how a community interacts with its physical environment.

K3. Identify components of the students' local ecosystem.

L1. Observe water as it changes in phase from solid to liquid to vapor.

L2. Compare changing shadows throughout the day.

L3. Identify, name and describe body parts that enable living things to move and change position.

L4. Observe seed germination and the directional nature of plant growth.

L5. Recognize the stages in the formation of soil.

M1. Recognize the characteristics of common living organisms.

M2. Know conditions that allow life to exist.

M3. Compare plants to animals.

M4. Observe by experimentation the variety and quantity of food eaten by an animal.

N1. Recognize body parts that are associated with the senses.

N2. Recognize that breathing is a necessary life process.

N3. Identify and compare body parts that enable living things to move and change position.

N4. Compare different kinds of body coverings.

N5. Compare seeds by their structure and function.

O1. Observe the force due to gravity.

O2. Compare the mass of two objects.

O3. Demonstrate that a force is needed to move an object at rest.

O4. Observe an action and a reaction.

P1. Compare objects by using the five senses.

P2. Demonstrate how vibrating objects produce sound.

P3. Identify and discriminate among a variety of sounds.

P4. Compare how changes in perception of the environment result from modification of the normal senses.

P5. Identify the common two- and three-dimensional shapes.

Q1. Use simple devices to measure length, volume and mass.

Q2. Develop an experiment to measure time.

Q3. Demonstrate relative position using the directions above or below, right or left, in front of, in back of.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 6

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will have a working knowledge of the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 6, students should be able to:

A1. Compare types of symmetry.

A2. Demonstrate the relationships that exist among objects, light sources and shadows.

A3. Know the relationships between cloud types and weather conditions.

A4. Know the shapes of various crystal structures.

B1. Compare relative sizes and positions of bodies in the solar system.

B2. Identify a scheme to classify living organisms.

B3. Understand that events in nature may follow an orderly progression.

C1. Compare the structures common to all living cells.

C2. Identify the components of atoms.

C3. Identify rocks and stones by their physical characteristics and method of formation.

D1. Observe change that occurs during an experiment and identify it as evidence of interaction.

D2. Identify components and conditions under which objects interact in a system.

D3. Relate adaptation of species to an environment.

D4. Identify interrelationships between living organisms and the natural world.

E1. Identify variables in the environment that affect the size of an animal or plant population.

E2. Understand populations and how they interact within a community.

E3. Understand the interactions between predator and prey.

F1. Identify substances as elements, compounds or mixtures.

F2. Compare the properties of matter making use of length, mass, time, or frames of reference.

F3. Demonstrate a procedure for separating a mixture into its components.

F4. Understand that heat energy can be transferred by conduction, convection, and radiation.

F5. Demonstrate the use of insulators to prevent energy transfer.

H1. Understand the relationship between a compass and the earth's magnetic field.

H2. Demonstrate an electromagnet.

H3. Demonstrate the generation of electrical energy.

H4. Identify gravity as earth's attraction on objects.

I1. Identify variables and relate them to the result of a simple experiment.

I2. Understand the stimulus-response relationship in plants and animals.

I3. Understand factors that influence weather.

I4. Observe the effect of air pressure.

J1. Know the water cycle.

J2. Identify stages in the life cycles of selected organisms.

J3. Know the relationship of various organisms within food chains.

J4. Relate seasons to the revolution of the earth around the sun.

K1. Identify characteristics of selected ecosystems.

K2. Know characteristics of objects in the solar system.

K3. Identify the components of a simple electrical system.

L1. Identify characteristic stages of growth and development of selected organisms.

L2. Know how weather affects the environment.

L3. Identify conditions that produce changes in plants.

L4. Recognize that stars change over billions of years.

M1. Know physiological activities that help organisms survive.

M2. Recognize changes in organisms during their lifetimes.

M3. Compare behavioral patterns of animals.

M4. Demonstrate that plants react to changes in their surroundings.

N1. Know the function of the human eye.

N2. Know the auditory function of the human ear.

N3. Know the structure of a seed.

N4. Know the functions of skin, muscle, and bone.

O1. Understand frictional forces.

O2. Identify some simple and compound machines that you use every day and relate how they work.

O3. Demonstrate a procedure for determining the linear speed (velocity) of a rolling object.

P1. Demonstrate an illusion of motion.

P2. Demonstrate that white light is composed of various colors.

P3. Contrast reflection and refraction.

P4. Understand how the physical properties of sound relate to perception.

Q1. Demonstrate a procedure for drawing an object to a given scale.

Q2. Construct a device with unique units of measurement for measuring length, volume, mass, and time.

Q3. Identify the position of an ordered number pair on a map or grid.

Q4. Demonstrate a system to identify the position of a student in class relative to other students.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 8

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will have a working knowledge of the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 8, students should be able to:

A1. Compare the crystal forms of several pure solids.

A2. Compare symmetry and patterns found in plants and animals.

A3. Recognize patterns that result from geological processes.

B1. Demonstrate the necessity for organizing orderly systems of related facts.

B2. Recognize how different elements are categorized in the periodic table.

B3. Understand classification schemes of living organisms.

C1. Understand the characteristics of major parts of the atom.

C2. Know the structures of cells.

C3. Use the fundamental units of length, mass, and time found in the metric system of measurement.

D1. Understand how man interacts with other organisms in a food chain.

D2. Know how atoms interact in chemical reactions.

D3. Understand the roles of producers and consumers in pond water.

D4. Recognize forces which alter the earth's surface.

E1. Understand how organisms live in habitats, fill niches and interact with other parts of a community.

E2. Recognize factors that can affect a population of organisms.

E3. Compare different types of animal communities to the human community.

E4. Recognize symbiotic, competitive, and predator-prey relationships among organisms.

E5. Demonstrate a procedure for estimating a population of an area using a random sampling technique.

F1. Know the laws of conversions of matter, energy, and mass-energy.

F2. Recognize that the interaction of matter and energy is constantly changing the universe.

F3. Compare the phases of matter.

F4. Differentiate among the forms of energy at work in nature.

F5. Understand the effect of heat energy on matter.

G1. Demonstrate that a system is tending toward equilibrium.

G2. Relate diffusion to osmosis.

G3. Apply factors to an equilibrium that will cause it to shift.

H1. Recognize the causes of electric and magnetic forces and fields.

H2. Relate electricity to magnetism.

I1. Recognize how the sun affects air temperatures and pressures.

I2. Know how weathering, heating, cooling, and erosion change the surface of the earth.

I3. Relate a changing barometer to the impending change in weather.

J1. Know the rock cycle.

J2. Compare the role of decomposers to producers and consumers in a community.

J3. Understand metamorphosis as it refers to the developmental sequence of selected animals.

K1. Identify conditions that define a weather system.

K2. Identify the components of the nervous system.

L1. Understand phase change at the molecular level.

L2. Understand the process of radioactive decay.

L3. Know how the rate of dissolving can be altered.

M1. Compare the characteristics of a single cell to those of a multi-celled organism.

M2. Compare and contrast plant and animal cells.

M3. Compare the growth responses of plants under differing environmental conditions.

M4. Understand how various organisms adapt differently to the same environment.

N1. Understand the use of nutrients in the body.

N2. Know cellular functions within the major body systems.

N3. Know how cells organize into tissues, organs, and systems.

N4. Know the functions of skin, muscle, and skeletal systems.

N5. Relate the parts of flowering plants and explain their functions.

N6. Relate environmental conditions to the diversity of the structures and functions among plants and animals.

O1. Demonstrate how forces move objects.

O2. Understand the uses and advantages of simple machines.

O3. Relate forces to motion and work.

P1. Compare an object to its actual size when a scale is given.

P2. Recognize optical illusions as a flaw of perception.

P3. Understand how senses are enhanced.

P4. Compare the characteristics of an object by direct and indirect observation.

P5. Understand the production, transmission, and reception of sound.

Q1. Construct a calibrated device using the metric system to measure distance, volume, mass, and time.

Q2. Use longitude and latitude to find locations on a map.

Q3. Interpret information from evidence on earth's surface.

Q4. Relate geological time periods through evidence obtained from the earth's surface.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 10

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will have a working knowledge of the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 10, students should be able to:

A1. Relate crystal structures to geometric figures.

A2. Recognize the distribution pattern of volcanoes across the earth's surface.

A3. Compare similar characteristics of families of elements.

B1. Compare living organisms by applying a classification scheme.

B2. Know the major characteristics of the types of protists.

B3. Compare cloud types to changing weather conditions.

B4. Compare rocks and minerals using a classification scheme.

C1. Recognize the forces that determine the properties of matter.

C2. Identify the components of the DNA molecule.

C3. Recognize the relationships of atoms, elements, compounds, and mixtures.

D1. Recognize that a chemical equation describes a chemical reaction.

D2. Identify interactions of predator and prey.

D3. Demonstrate the distance/current relationship using a solar cell.

D4. Recognize that one population of organisms can affect another.

E1. Understand the interactions among populations of plants, herbivores, and carnivores.

E2. Identify the components necessary for a community to exist and survive.

E3. Compare a population growth curve to available natural resources.

F1. Recognize that wave motion explains the transmission of sound.

F2. Demonstrate that an energy change accompanies a chemical change.

F3. Know why the earth is considered to be a storehouse of matter and energy on which all living things depend.

F4. Use the kinetic molecular theory to explain phase change.

F5. Classify samples of matter by their characteristic physical and chemical properties.

G1. Recognize that good conservation practices depend on understanding the balance between living things and their environment.

G2. Demonstrate equilibrium using levers.

H1. Identify variables that affect the size of electric and magnetic fields.

H2. Understand the relationship between gravity and tides.

I1. Understand the principle of cause and effect as it applies to disease.

I2. Know a theory used to account for movements of the earth's crust.

I3. Recognize that the populations of plants and animals change as the environment changes.

J1. Relate each phase of the moon to a position in its orbit around the earth.

J2. Know the carbon oxygen and nitrogen cycles.

J3. Relate the processes by which organisms capture, utilize and release energy.

J4. Know how temperature affects the water cycle.

K1. Understand major body systems.

K2. Examine the dynamics of a fresh water system.

K3. Identify selected systems within the universe.

K4. Relate air masses and fronts to storms.

L1. Understand how the velocity of a falling object varies with time.

L2. Observe examples of change in matter and decide if they are of a physical or chemical nature.

L3. Identify situations in which potential energy changes to kinetic energy.

L4. Identify factors that could alter the rate of change in an environment.

M1. Understand how a micro-organism moves, obtains foods, excretes waste, responds to stimuli, and reproduces within its environment.

M2. Understand that complex animals carry out vital processes within organ systems which are separate in function but mutually dependent.

M3. Recognize basic animal systems using preserved specimens.

M4. Compare processes by which matter and energy are transported throughout an organism.

N1. Identify and describe functions of tissues and organs.

N2. Identify body changes and explain how hormones cause some of these body changes.

N3. Relate the chemical activity of an element to the number of electrons in the outer shell of the atom of that element.

N4. Know the genetic basis of diversity.

N5. Recognize that there has been a consistent and orderly pattern of development from simple to more complex organisms.

N6. Relate how natural selection can serve as a model for change in organisms.

O1. Distinguish among the known fundamental forces in the universe.

O2. Understand force, work, and power.

O3. Relate the resulting movement of an object to the forces applied.

P1. Differentiate between color and pigmentation.

P2. Identify how sound travels and identify its properties.

P3. Know sources of visible and invisible radiations.

P4. Demonstrate changes in images resulting from the use of a variety of lenses and mirrors.

P5. Observe the results of wave refraction.

Q1. Construct a map of an area to scale.

Q2. Locate objects and places using rectangular coordinates and angular degrees.

Q3. Understand the use of contour lines to illustrate elevations.

Q4. Understand the use of reference points to describe the relative position of objects.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 12

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will have a working knowledge of the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 12, students should be able to:

A1. Support the statement that living things receive their characteristics from the parent organism(s).

B1. Relate the orderly development of life forms in geologic history from available evidence.

C1. Understand the classification of matter.

C2. Understand the importance of acids, bases, and salts in industry and the home.

D1. Evaluate the effect of a natural disaster on the human population.

D2. Recognize the relationships that exist between earthquake locations and the edges of tectonic plates.

D3. Identify examples of simple chemical reactions that occur frequently in our daily lives.

E1. Understand that communities are affected by limiting factors.

E2. Understand that an ecosystem consists of a community interacting with its physical environment.

F1. Identify examples and demonstrate how waves may be produced when energy is transferred.

F2. Recognize the results of the effect of heat energy on samples of matter.

G1. Predict how chemical equilibrium will change when different stresses are applied to the system, each independent of the other.

G2. Understand dynamic equilibrium.

H1. Understand the principle and implications of friction.

H2. Identify conductors and insulators.

I1. Identify several ways that people's activities accelerate soil erosion.

I2. Identify factors which influence weather.

J1. Understand that seasonal changes relate to the position of the earth as it revolves around the sun.

J2. Understand the basic cycles that occur in a ecosystem.

K1. Recognize and compare major cell processes such as respiration, protein synthesis, and photosynthesis.

K2. Know that the earth is a closed system in space with limited resources.

L1. Analyze the changes which occur as simple organisms evolve.

L2. Understand the effect of various factors on the rate of reaction.

M1. Understand that all life is derived from living organisms.

M2. Understand that the basic unit of inheritance is DNA.

M3. Recognize that all organisms exhibit responses to stimuli.

N1. Know the principal environmental factors that limit the distribution of plants and animals.

N2. Understand natural selection.

N3. Identify the major organs of the human body and relate them to a function.

O1. Relate a general understanding of gravity.

P1. Recognize the differences between reflection and refraction of light.

Q1. Understand vector quantities and apply them to a simple problem.

Q2. Identify methods for determining the age and size of the universe.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 3

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will have a working knowledge of the social and environmental implications and limitations of technological development.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 3, students should be able to:

Objectives for this State Goal for Learning may be more appropriate at other grade levels.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 6

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will have a working knowledge of the social and environmental implications and limitations of technological development.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 6, students should be able to:

A1. Know important scientific contributions.

A2. Identify a selected number of examples of technology.

B1. Recognize that organisms depend on the earth and atmosphere for water.

B2. Identify some of Illinois' natural resources as renewable or nonrenewable.

B3. Know the major energy sources people use today to meet their energy needs.

B4. Understand the reasons for wise use of natural resources.

C1. Understand the environmental implications of our changing life styles.

C2. Understand how living organisms are affected by pollution.

D1. Identify science-related careers and avocations.

D2. Know activities of people in scientific/technological careers.

E1. Conduct a simple consumer research survey based upon the scientific method.

E2. Relate the contents of selected products from the supermarket to their use.

E3. Recognize how scientific knowledge can be used in making intelligent purchases.

F1. Know hazards presented by common household products.

F2. Identify environmentally sound consumer products.

F3. Differentiate between materials that can be reused or recycled and those that cannot.

F4. Identify materials as biodegradable or nonbiodegradable.

G1. Suggest solutions to selected pollution problems.

G2. Compare essential to nonessential uses of energy in the local environment.

G3. Recognize the changes in the physical environment resulting from human activity.

H1. Contrast pleasant with unpleasant environmental conditions.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 8

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will have a working knowledge of the social and environmental implications and limitations of technological development.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 8, students should be able to:

A1. Compare and contrast the differences between science and technology.

A2. Identify newspaper and magazine articles as science or technology stories.

A3. Identify areas of current scientific research that may evolve as technological developments.

B1. Analyze the effects of recycling.

B2. Understand the dependence of society on geologic resources.

B3. Understand the positive and negative aspects of the consumption of renewable and nonrenewable resources.

B4. Relate our future energy supply to finding new sources and wise use of current supplies.

C1. Know the interrelationships between the manufacturing of goods and the raw materials from which they are derived.

C2. Know differences between natural and man-made pollution.

C3. Understand how communities are affected by improved technology.

D1. Understand how personal items are made available as a result of technological advances.

D2. Identify careers in which scientific training is important.

D3. Identify sources of financial support for scientific and technological research.

D4. Relate a political or economic event to a resulting technological development.

E1. Contrast the present limitations of the earth's natural resources with consumer demands.

E2. Identify items considered essential today that were not available 5 years ago, 15 years ago, 25 years ago.

E3. Evaluate validity of advertising claims.

F1. Identify interacting elements within a community.

F2. Know potential effects of hazardous substances on the body.

F3. Identify the biome in which you live.

F4. Know the meaning of succession.

G1. Relate how scientists can be helpful in solving societal problems.

G2. Identify activities that can be used to conserve energy.

G3. Develop a plan to recycle items used in school.

G4. Identify the characteristics of a life style that would make it ecologically sound.

G5. Understand how the local community solves the problem of disposal of solid waste material.

H1. Classify pictures or stories from periodicals according to environmental response.

H2. Evaluate the main points of a technological issue.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 10

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will have a working knowledge of the social and environmental implications and limitations of technological development.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 10, students should be able to:

A1. Understand the impact of technological developments on society.

B1. Identify materials now in use that are replacing natural resources.

B2. Identify technologies that use renewable energy resources.

B3. Relate future energy to the need for new resources.

B4. Relate farming practices to soil conservation.

C1. Evaluate data collected by scientists and others to demonstrate changes in the atmosphere.

C2. Understand how scientific and technological endeavors involve cooperation among individuals and groups.

C3. Understand potential consequences resulting from interaction between technological advances and the environment.

D1. Identify future vocations in science.

D2. Recognize contributions to science and technology of men and women of various ethnic groups.

D3. Formulate positions on environmental issues after consideration of available scientific information.

D4. Compare and contrast the quality of life 100 years ago with our current life style.

E1. Relate advertising techniques to consumer demands.

E2. Evaluate the need for additives in products used in the home.

E3. Understand the use of the scientific method in consumer decision making.

F1. Identify the positive effects of establishing a balance of harvest and renewal in our environment.

F2. Analyze the quality of life.

F3. Predict the effects of new technologies on human ecosystems.

F4. Identify major factors which affect population growth and decline.

G1. Develop an environmental impact statement for a local project.

G2. Develop a philosophy for protecting the local environment.

G3. Evaluate the goals of a selected environmental organization.

G4. Know how scientific inquiry is influenced by beliefs, traditions, views and actions of society.

H1. Understand the operation of a recycling plant.

H2. Relate a television or radio commentary to a scientific or technological issue and formulate a personal opinion.

H3. Use the scientific method to formulate an opinion on an environmental issue.

H4. Predict the consequences of technological change.

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will have a working knowledge of the social and environmental implications and limitations of technological development.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 12, students should be able to:

A1. Understand the interdependence of science, technology, and the economy relative to their development.

A2. Identify situations in which moral and ethical beliefs have affected the application of science.

B1. Understand ways that people can minimize the depletion of the earth's resources.

B2. Evaluate the ways in which natural resources have been allocated, utilized, and conserved in the nation.

C1. Recognize the implications of modern genetic technology.

C2. Recognize that controversy exists concerning controls versus noncontrols over the application of technology.

D1. Relate several ways viruses and bacteria are used in industry and research.

D2. Recognize several major events in the history of space travel.

D3. Understand how satellites are used to study the earth, its weather, and land resources.

E1. Analyze the impact of the accumulation of scientific and technological knowledge.

E2. Predict the effects of computer science on lifestyles, economics, and politics.

F1. Relate the biological increase of certain toxic substances in a food chain.

F2. Analyze the properties of water that cause it to be vital to an ecosystem.

G1. Recognize the variety of Illinois' natural areas and relate them to economics and recreation.

G2. Relate the chemical formation and effects of acid rain.

H1. Defend a position based upon research focused on a societal problem.

H2. Evaluate the economic, political, and social implications of scientific and technological developments.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will have a working knowledge of the principles of scientific research and their application in simple research projects.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 3, students should be able to:

A1. Recognize why experiments are conducted.

A2. Know how to report results of experiments in a variety of ways.

A3. Recognize reasons for differences in experimental results.

B1. Recognize the types of data that can be collected from a simple experiment.

B2. Know how to record results of an experiment accurately.

B3. Compare their experimental results with others.

B4. Demonstrate the need for order and cleanliness in an experiment.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will have a working knowledge of the principles of scientific research and their application in simple research projects.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 6, students should be able to:

A1. Demonstrate how to work effectively in a laboratory group with other students.

A2. Acknowledge the assistance from others in a given experiment.

A3. Recognize conflicting data resulting from an investigation.

B1. Contrast relevant with irrelevant information.

B2. Relate accurately the findings and conclusions of laboratory investigations.

B3. Understand reasons for organizing data into tables, charts, and graphs.

B4. Recognize the need for safety procedures during experimentation.

B5. Identify the important qualities of a scientist.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will have a working knowledge of the principles of scientific research and their application in simple research projects.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 8, students should be able to:

A1. Compare experimental data to those obtained by others.

A2. Recognize that experimental results are replicable.

A3. Analyze the impact of using animals in scientific research.

A4. Understand why scientists rely on the work of other scientists.

A5. Demonstrate effective participation as a member of a laboratory group.

B1. Relate hypotheses or working assumptions in a concise manner.

B2. Demonstrate alternative procedures for solving a problem.

B3. Understand the need to acquire, organize, and evaluate data.

B4. Relate why controlled variables are used in an experiment.

B5. Demonstrate accurate measuring techniques.

B6. Relate a laboratory procedure that another student can follow.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will have a working knowledge of the principles of scientific research and their application in simple research projects.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 10, students should be able to:

A1. Replicate the results of an experiment.

A2. Recognize that their experimental results must be open to the scrutiny of others.

A3. Relate alternatives to using animals in scientific research.

A4. Recognize the difference between methods used by scientists and the process by which myths and superstitions develop.

A5. Evaluate reasons for obtaining conflicting data.

B1. Identify prominent scientists from several cultures.

B2. Relate data that reflect the accuracy of measuring devices.

B3. Demonstrate the ability to draw conclusions from collected data.

B4. Demonstrate various ways to display the same data.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will have a working knowledge of the principles of scientific research and their application in simple research projects.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

The following objective relates to all knowledge and skills of this State Goal for Learning.

By the end of GRADE 12, students should be able to:

A-B. Apply scientific knowledge, through the proper use of techniques, laboratory instruments, and the unbiased reporting of results.

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will have a working knowledge of the processes, techniques, methods, equipment and available technology of science.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 3, students should be able to:

A1. Recognize that data is collected through use of the senses.

B1. Identify similarities and differences in a set of objects or events.

C1. Recognize an inference made from direct observation.

D1. Formulate a prediction based upon direct observation.

E1. Use counting as a means of gathering data.

F1. Relate the results of an experiment.

G1. Gather data from simple experiments.

I1. Understand that questions can be answered by experiments.

J1. Follow directions to complete a simple experiment.

K1. Distinguish between a word model and a physical model.

L1. Compare their experimental results with those of others.

M1. Recognize the use of certain measuring devices.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 6

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will have a working knowledge of the processes, techniques, methods, equipment and available technology of science.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 6, students should be able to:

A1. Record data after observing objects and events.

B1. Use a classification key to place objects or events within a scheme.

C1. Distinguish between an observation and an inference.

D1. Confirm a prediction through experimentation.

E1. Use estimating as a means of gathering data.

F1. Understand the organization of a data table.

G1. Test an inference by collecting data.

H1. Recognize an operational definition.

I1. Use the results of an experiment to answer an appropriate question.

J1. Identify the variables in a simple experiment.

K1. Use words to create a visual image.

L1. Demonstrate consistency in repeated trials of an experiment.

M1. Use appropriate equipment to measure mass, distance, time, and temperature.

BIOLOGICAL AND PHYSICAL SCIENCES
GRADE 8

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will have a working knowledge of the processes, techniques, methods, equipment and available technology of science.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 8, students should be able to:

A1. Recognize the need for appropriate instruments to aid in observation.

B1. Use a classification scheme to organize objects.

C1. Recognize an inference based upon experimental observation.

D1. Evaluate the validity of a prediction through experimentation.

E1. Use standard units to measure properties of objects.

F1. Report the results of an experiment using tables and graphs.

G1. Develop an appropriate procedure for analyzing data.

H1. Use an operational definition developed from a simple experiment.

I1. Distinguish among questions to recognize those that are testable in the laboratory.

J1. Identify the variables in an experiment and suggest ways to control them.

K1. Demonstrate knowledge of an existing scientific model.

L1. Demonstrate reliability by repeating an experiment.

M1. Use appropriate equipment to measure the volume of an irregular object.

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will have a working knowledge of the processes, techniques, methods, equipment and available technology of science.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 10, students should be able to:

A1. Apply quantitative observational methods to accumulate precise data.

B1. Construct a classification scheme and demonstrate its use.

C1. Evaluate and revise an inference based upon additional data.

D1. Revise a prediction on the basis of additional information.

E1. Identify appropriate methods of measurement for a given task.

F1. Analyze the results of an experiment.

G1. Evaluate the interpretation of data collected during an experiment.

H1. Analyze an operational definition based upon a simple experiment.

I1. Use direct observation to develop a question to be answered in the laboratory.

J1. Distinguish between independent and dependent variables in an experiment.

K1. Use models to interpret scientific phenomena.

L1. Distinguish between precision and accuracy.

M1. Identify possible sources of error in measuring instruments.

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will have a working knowledge of the processes, techniques, methods, equipment and available technology of science.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

The following objective relates to all knowledge and skills of this State Goal for Learning:

By the end of GRADE 12, students should be able to:

A-M. Apply observation, hypothesis, theory, model, law, and assumption to everyday situations.

APPENDIX A

STATE GOALS FOR LEARNING--SIX AREAS OF LEARNING

LANGUAGE ARTS

The skills and knowledge of the language arts are essential for student success in virtually all areas of the curriculum. They are also central requirements for the development of clear expression and critical thinking. The language arts include the study of literature and the development of skills in reading, writing, speaking, and listening.

As a result of their schooling, students will be able to:

- read, comprehend, interpret, evaluate and use written material;
- listen critically and analytically;
- write standard English in a grammatical, well-organized and coherent manner for a variety of purposes;
- use spoken language effectively in formal and informal situations to communicate ideas and information and to ask and answer questions;
- understand the various forms of significant literature representative of different cultures, eras, and ideas;
- understand how and why language functions and evolves.

MATHEMATICS

Mathematics provides essential problem-solving tools applicable to a range of scientific disciplines, business and everyday situations. Mathematics is the language of quantification and logic; its elements are symbols, structures and shapes. It enables people to understand and use facts, definitions, and symbols in a coherent and systematic way in order to reason deductively and to solve problems.

As a result of their schooling, students will be able to:

- perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions and decimals;
- understand and use ratios and percentages;
- make and use measurements, including those of area and volume;
- identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs;

- understand and apply geometric concepts and relations in a variety of forms;

- understand and use methods of data collection and analysis, including tables, charts and comparisons;

- use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.

BIOLOGICAL AND PHYSICAL SCIENCES

Science is the quest for objective truth. It provides a conceptual framework for the understanding of natural phenomena and their causes and effects. The purposes of the study of science are to develop students who are scientifically literate, recognize that science is not value-free, are capable of making ethical judgments regarding science and social issues, and understand that technological growth is an outcome of the scientific enterprise.

As a result of their schooling, students will have a working knowledge of:

- the concepts and basic vocabulary of biological, physical and environmental sciences and their application to life and work in contemporary technological society;

- the social and environmental implications and limitations of technological development;

- the principles of scientific research and their application in simple research projects;

- the processes, techniques, methods, equipment and available technology of science.

SOCIAL SCIENCES

Social sciences provide students with an understanding of themselves and of society, prepare them for citizenship in a democracy, and give them the basics for understanding the complexities of the world community. Study of the humanities, of which social sciences are a part, is necessary in order to preserve the values of human dignity, justice and representative processes. Social sciences include anthropology, economics, geography, government, history, philosophy, political science, psychology and sociology.

As a result of their schooling, students will be able to:

- understand and analyze comparative political and economic systems, with an emphasis on the political and economic systems of the United States;

- understand and analyze events, trends, personalities, and movements shaping the history of the world, the United States and Illinois;

- demonstrate a knowledge of the basic concepts of the social sciences and how these help to interpret human behavior;

- demonstrate a knowledge of world geography with emphasis on that of the United States;

- apply the skills and knowledge gained in the social sciences to decision making in life situations.

FINE ARTS

The fine arts give students the means to express themselves creatively and to respond to the artistic expression of others. As a record of human experience, the fine arts provide distinctive ways of understanding society, history and nature. The study of fine arts includes visual art, music, drama and dance.

As a result of their schooling, students will be able to:

- understand the principal sensory, formal, technical and expressive qualities of each of the arts;

- identify processes and tools required to produce visual art, music, drama and dance;

- demonstrate the basic skills necessary to participate in the creation and/or performance of one of the arts;

- identify significant works in the arts from major historical periods and how they reflect societies, cultures and civilizations, past and present;

- describe the unique characteristics of each of the arts.

PHYSICAL DEVELOPMENT AND HEALTH

Effective human functioning depends upon optimum physical development and health. Education for physical development and health provides students with the knowledge and attitudes to achieve healthful living throughout their lives and to acquire physical fitness, coordination and leisure skills.

As a result of their schooling, students will be able to:

- understand the physical development, structure and functions of the human body;

- understand principles of nutrition, exercise, efficient management of emotional stress, positive self-concept development, drug use and abuse, and the prevention and treatment of illness;

- understand consumer health and safety, including environmental health;
- demonstrate basic skills and physical fitness necessary to participate in a variety of conditioning exercises or leisure activities such as sports and dance;
- plan a personal physical fitness and health program;
- perform a variety of complex motor activities;
- demonstrate a variety of basic life-saving activities.

APPENDIX B

LEARNING OBJECTIVES AND ASSESSMENT--QUESTIONS AND ANSWERS

Question: When will the first plan be due?

Answer: The first plan must be submitted by August 31, 1987.

Question: Can a district submit its plan earlier so that the objectives, assessment systems, and reporting procedures are approved prior to the beginning of the 1987-88 school year?

Answer: Yes. The State Board will be prepared to receive plans in the spring of 1987. Districts are encouraged to submit their plans as early as possible.

Question: What are the criteria for the approval of plans?

Answer: Specific criteria will be listed in rules currently being developed for this program. The criteria will be based on the legislative requirement that the local objectives meet or exceed the State Learning Goals, that the assessment procedures are adequate to determine the degree to which students are meeting these objectives, and that reporting procedures are sufficient to inform the public about the objectives, the assessment results, and the plans for improvement.

Question: What assistance is available to school districts?

Answer: Many forms of assistance are presently available and others are being developed:

1. The Illinois General Assembly appropriated $2.7 million in FY 86 and $2.55 million in FY 87 to assist local school districts in implementing this program. Each district may receive $1.31 per enrolled student this year by submitting an application for funds by October 15, 1986.

2. A final set of Sample Learning Objectives in each of the six fundamental areas of learning will be distributed in late September 1986; these will be based on revision of the Draft Model Learning Objectives in the six fundamental areas that were released in the spring of 1986.

3. An assessment item bank is being developed and test items from that bank will be available to districts in the fall of 1987.

4. Ten local school districts were funded in FY 86 as demonstration sites for development of model outcome/assessment systems and materials. Plans to continue and to expand this effort in FY 87 are under development.

5. Consultants to assist local school districts in the area of reading are available through the Educational Service Centers. Consultants in other areas will soon be available.

6. Workshops will be conducted and materials and publications will be distributed beginning this winter.

Question: How can a district receive assistance?

Answer: Districts should contact the Educational Service Center in their area. In addition, information and assistance regarding the development of objectives can be received from the Program Planning and Development Section or the Program Evaluation and Assessment Section, State Board of Education.

Question: Does a school district have to adopt the Sample Learning Objectives?

Answer: No. They are samples provided only to assist districts in the development of their local objectives.

Question: Why are there state test items?

Answer: In order to measure student learning against the state goals, the legislation requires that state test items be included in the local assessment system.

The General Assembly has indicated that it expects to receive information to help answer at least the following questions:

> How does student performance in Illinois schools compare with statewide student performance?
>
> To what extent are trends in achievement in each Learning Outcome area indicating decline, stability, or growth in performance over time?

Each of these questions will be studied by using the results of the state items for each grade and curricular area tested.

Question: How will the state testing items be developed?

Answer: Illinois teachers and other education professionals selected statewide will form committees that will help match test items to the state goals and construct the pilot tests. The items will be field-tested, statistically analyzed, and reviewed again by the committees.

Question: What will the relationship between state assessment items and the Sample Learning Objectives be?

Answer: There will be no direct relationship between the two. State assessment items will be based on the State Goals for Learning.

Question: Are Sample Learning Objectives the same as instructional objectives?

Answer: No. The Sample Learning Objectives define knowledge or skills at a school district, rather than a classroom, level. In that sense, they are more like school district learning goals than typical instructional objectives. In fact, they are called "objectives" in strict compliance with the language of the law. For all practical purposes they can be viewed as school district learning goals.

Question: Will the state testing items be available to the schools in advance?

Answer: The state testing items to be administered in any given year will not be available to schools for preview. However, sample items will be published for all student learning outcomes. These will be sent to all school districts prior to administration of state testing items in a curricular area. For example, a booklet of sample mathematics test items will be sent to districts prior to the administration of state mathematics testing items in spring of 1989. The booklet will contain sample items for all mathematics learning outcomes, keyed to the four grade levels to be tested (i.e., 3, 6, 8, and 10).

Question: To whom and how will state testing data be reported?

Answer: Each school will receive its students' mean scores in raw score units as well as the school's percentile rank in Illinois for each Learning Outcome area tested as well as comparisons by Learning Outcome area statewide.

Each school district will receive the above results for each of its schools as well as similar mean scores for the district as a whole.

The General Assembly and the Governor will receive a report from the State Board including:

- the state's average performance and range of achievement for each learning area tested in raw score units and percentiles;
- results of additional statistical analyses and interpretations, especially curricular strengths and weaknesses, trends and evidence of significant correlations; and
- national comparisons.